The DRINC (Drinking Reasons Inter-National Collaboration) project: Rationale and protocol for a cross-national study of drinking motives in undergraduates

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Abstract

Drinking motives are a proximal predictor of alcohol use and misuse through which the effects of more distal influences (e.g., personality) on alcohol-related outcomes are mediated. Although Cooper's (1994) four-factor drinking-motives model has been well validated in North America, few studies have validated this model in other countries. The aim of the present paper is to describe the rationale, protocol, and methods of a project designed to evaluate the cross-national validity and generalizability of Cooper's (1994) measure, as modified by Kuntsche and Kuntsche's Drinking Motives Questionnaire Revised Short Form (DMQ–R SF, 2009), and of the theoretical model (Cooper, Frone, Russell, & Mudar, 1995) linking drinking motives to specific personality risks and alcohol consequences. The project uses data from undergraduates representing 10 nations (Brazil, United Kingdom and Republic of Ireland, Canada, Hungary, Mexico, the Netherlands, Portugal, Spain, Switzerland, and the United States; total $N = 8,478$). Findings from this collaboration can be used to guide international researchers in determining the suitability of the DMQ–R SF as a measure of drinking motives in countries outside of North America and may have implications for the development of preventive and therapeutic interventions for alcohol misuse among young adults globally.

The Drinking Reasons Inter-National Collaboration (DRINC) team is a global network of investigators focused on the cross-national study of drinking motives (i.e., the particular reasons why people drink). Past research has shown that drinking motives predict, theoretically and practically, meaningful differences in patterns and consequences of alcohol use (see Cooper, Kuntsche, Levitt, Barber, & Wolf, 2015, for a review). In the present paper, we will provide a brief summary of the underlying theory and research on motivational models of alcohol use, outline the primary rationale and goals for this collaborative research effort, and describe each of the data sets that comprise the project.

Underlying Theory and Research

Cox and Klinger (1988, 1990, 2004) proposed the most widely known and influential motivational model of alcohol use. According to their model, people's lives are organized around the pursuit and enjoyment of incentives, defined as the joint operation of a need within the person and a condition in the environment with the potential to satisfy that need (Geen, 1995). A person's motivation to

drink can therefore be seen as a complex product of the incentives he or she associates with drinking. In other words, a person decides to drink as a function of anticipated positive affective consequences of drinking— either increases in positive affective outcomes or decreases in negative ones. Thus, alcohol use can be usefully understood as a strategic behavior in which people choose to drink based on the anticipated affective outcomes (Cox & Klinger, 1988, 1990).

Cox and Klinger (1988, 1990) hypothesize that two primary incentives underlie emotionally driven behaviors such as alcohol use. These include the degree to which the behavior (1) is motivated by a desire to avoid, escape, or minimize a negative outcome (avoidance) versus pursue a positive or pleasurable one (approach), and (2) is internally focused or directed toward oneself (self) versus externally focused or directed toward socially significant others (social). According to this model, these two dimensions can be crossed to yield four categories of motives: (1) self-focused approach motivations, such as drinking to enhance physical or emotional pleasure (i.e., enhancement motives);

(2) self-focused avoidance motives, such as drinking to avoid or minimize negative emotions (i.e., coping motives); (3) social approach motives, such as drinking as a way to bond with others (i.e., social motives); and (4) social avoidance motives, such as drinking to avoid social censure (i.e., approval or conformity motives).

Substantial evidence supports the existence of the four theoretically predicted motives. For example, motives have been consistently associated with unique patterns of antecedents and consequences and have been shown to serve as a final common pathway to alcohol use through which the effects of causally prior factors, including personality, are mediated (Cooper et al., 1995; Littlefield, Sher, & Wood, 2010; Read, Wood, Kahler, Maddock, & Palfai, 2003; Stewart, Zvolensky, & Eifert, 2002; see Cooper et al., 2015, for a review). Moreover, the finding that different motives appear to be embedded in distinct etiologic pathways has important implications for tailoring prevention and intervention efforts aimed at reducing alcohol misuse. For example, recent randomized controlled trials conducted in Canada indicate that brief skills training interventions targeting young drinkers' unique drinking motives (e.g., coping vs. enhancement) and associated personality risk factors (e.g., hopelessness vs. sensation seeking) significantly reduce levels of heavy drinking and alcohol-related problems (Conrod, Stewart, Comeau, & Maclean, 2006; Watt, Stewart, Conrod, & Schmidt, 2008). Moreover, adults who were randomly assigned to either motive-matched or motive-mismatched interventions have shown clearly better outcomes for motive-matched interventions (Conrod et al., 2000).

Despite the importance of motives both theoretically and pragmatically, the overwhelming majority of work has been conducted in North America (Cooper et al., 2015; Kuntsche et al., 2014; Wicki, Kuntsche, & Gmel, 2010). The purpose of DRINC is therefore to develop an international network of scholars dedicated to the study of drinking motives with the long-term goal of promoting research cross-culturally and cross-nationally.

Goals and Rationale of DRINC

The more immediate goals of DRINC are fourfold: (1) to examine the generalizability of the factor structure of the measure of drinking motives across nations; (2) to examine the mean structure of motives and the extent to which this structure is invariant across nations; (3) to test the generalizability of key tenets of Cooper's model linking drinking motives to unique antecedent personality risks and alcohol consequences (Cooper et al., 1995; Cooper, Agocha, & Sheldon, 2000; Cooper et al., 2015); and (4) to explore socio-cultural differences that might explain any observed differences in factor structure, mean levels of endorsement, or links among motives, antecedents, and consequences.

Generalizability of the four-factor structure. It is widely agreed that establishing invariance of the factor structure of a measure is prerequisite to conducting meaningful cross-group comparisons (Wu, Li, & Zumbo, 2007). As such, the first goal of this collaboration is to examine the invariance

of the four-factor structure of the measure of drinking motives (Cooper, 1994; Kuntsche & Kuntsche, 2009) across 10 nations. To date, the factor structure has been shown to be highly similar across all countries examined, including the United States, Brazil, Canada, Switzerland, England, Hungary, Australia, Spain, the Netherlands, Belgium, Denmark, Estonia, Finland, Ireland, Italy, Poland, Portugal, Scotland, Slovakia, and Wales (Crutzen & Kuntsche, 2012; Hauck-Filho, Teixeira, & Cooper, 2012; Kuntsche et al., 2014; Kuntsche, Stewart, & Cooper, 2008; Lyvers, Hasking, Hani, Rhodes, & Trew, 2010; Mazzardis, Vieno, Kuntsche, & Santinello, 2010; Németh et al., 2011). Only a handful of studies have directly compared the structure of motives across countries (Kuntsche et al., 2008; Kuntsche et al., 2014; Németh et al., 2011) and have found support for the invariance of the four-factor structure of drinking motives across the countries compared.

The present collaboration extends this body of work in two important ways. First, no studies involving a direct comparison of more than two countries have been conducted in university student samples, whereas the present project extends this comparison to 10 countries. Second, whereas past research indicates that the expected factors consistently emerge in most countries (thus implying configural invariance), the present study will also test metric invariance (i.e., that factor loadings are statistically invariant) as well as factor covariance invariance and factor variance invariance (i.e., that correlations among the latent factors are also statistically invariant; Steenkamp & Baumgartner, 1998).

Comparison of mean levels of endorsement. To the extent that the measure meets reasonable standards of invariance across groups (Wu et al., 2007), a second aim of this collaboration is to compare mean levels of the four motives across countries. Past research points to intriguing differences between national groups. For example, Canadian and American youth scored higher than their Swiss counterparts on conformity motives, whereas Swiss adolescents scored higher than American adolescents on enhancement and coping motives (Kuntsche et al., 2008). Such cross-country comparisons might help elucidate differences in susceptibility to alcohol problems and rates of alcohol use across countries, and indeed mean level differences in motives might mediate or explain country-level differences in observed patterns of consumption and problems.

In addition, we will examine the invariance of profiles of relative endorsement across countries. Past research suggests that similar profiles should exist cross-nationally in which social and enhancement motives are much more strongly endorsed than either coping or conformity motives (Kuntsche et al., 2008; Németh et al., 2011; see Cooper et al., 2015, for a review).

Generalizability of links among motives, antecedents, and consequences. Assuming invariance of the basic four-factor structure, the third goal of this collaboration will be to determine whether motives are embedded in distinct etiologic networks parallel to those observed in research conducted in North America. More specifically, we will

test the invariance across countries of models in which personality is depicted as a distal influence on alcohol-related outcomes, whose effects are at least partially mediated by motives (e.g., Cooper et al., 1995; Cooper et al., 2000). Importantly, distinctive patterns of mediation are expected. For example, neuroticism (a dispositional sensitivity to punishment and propensity to experience negative affect) should predict the use of alcohol to cope with negative emotions, and coping motives in turn should predict drinking problems both directly and indirectly via increased consumption (e.g., Cooper et al., 2000; Stewart, Loughlin, & Rhyno, 2001).

Although few studies testing the antecedents and consequences of drinking motives outside of North America have been conducted, what has been done points to important cross-national similarities in the downstream effects of motives on alcohol use and drinking problems. For example, similar to findings reported in the United States and Canada, studies conducted in Switzerland indicate that coping motives both directly and indirectly (via consumption) predict drinking problems, whereas enhancement motives only indirectly predict drinking problems via increased levels of consumption (Kuntsche, Knibbe, Gmel, & Engels, 2005; Kuntsche et al., 2008). In contrast, the personality antecedents of motives have received little attention in work conducted outside North America, and have not been considered at all in cross-national studies.

Thus the present collaboration will extend prior work by establishing the generality of the etiological models found to apply in North American samples, which can be seen as an important first-step toward determining the cross-cultural utility of prevention and intervention efforts targeting the motivational underpinnings of problematic alcohol use.

Cultural explanations of observed differences. The fourth goal of this collaboration is to investigate country-level, socio-cultural factors that might help explain differences in mean levels of motive endorsements across countries, as well as potential differences in the predictive validity of motives vis-à-vis alcohol outcomes. Potentially relevant socio-cultural factors include tightness versus looseness (Gelfand et al., 2011), individualism versus collectivism, masculinity versus femininity, long-term orientation, indulgence versus restraint, power distance (Hofstede, Hofstede, & Minkov, 2010), and language group (Germanic vs. Romance vs. Uralic). In addition, factors indexing drinking culture will also be considered, including degree of alcohol control policies (Brand, Saisana, Rynn, Pennoni, & Lowenfels, 2007) and other indicators of the ubiquity of alcohol use in the culture (e.g., percent abstainers, mean total volume consumed, percent heavy episodic drinkers, etc.; World Health Organization, 2014). For example, we expect that countries high in indulgence (the extent to which individuals within a culture try to control their desires and impulses) should show higher mean levels of enhancement motives relative to other countries, and that enhancement motives may also be a stronger predictor of alcohol outcomes in such countries.

To our knowledge, no prior research has taken this approach, and by so doing, we hope to shed new light on the meaning of cross-national similarities and differences in drinking motives and their related consequences.

Methods

Twenty-one data sets from 10 countries were acquired for cross-national analysis. Multiple data sets were included for each country when possible, particularly for Canada, the United States, and the United Kingdom and Republic of Ireland, in an attempt to increase the breadth of representation. All data sets included age, sex, drinking motives, alcohol use and related consequences; 13 data sets also included a common measure of the Five-Factor model of personality, the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992). Each country was represented by a minimum of 200 participants. One data set from Israel was screened out due to its small sample size ($N = 171$). Participants were university undergraduate students between the ages of 17–27 years. Students outside this range were excluded to ensure greater homogeneity in age across data sets and to yield samples that better typify the traditional university undergraduate. To ensure the meaningfulness of motive reports, which are phrased in terms of reasons why a person drinks, alcohol abstainers were also excluded. Table 1 lists final sample sizes, mean ages, and sex distributions for each data set and each country, along with the language and method of administration, collaborators, year of data collection, and key publications.

Procedure

All data were collected in compliance with guidelines outlined in the Declaration of Helsinki (World Medical Association, 1997). The 20-item Drinking Motives Questionnaire Revised (DMQ–R; Cooper, 1994), the 60-item NEO-FFI (Costa & McCrae, 1992), and measures of frequency, quantity, and consequences of alcohol use were administered as paper-and-pencil or online surveys. Collaborators provided translations and back-translations when measures were administered in languages other than English. The DMQ–R SF, based on 12 of the original 20 items from the DMQ–R, will be used in statistical analyses, as it was developed specifically for use in cross-cultural studies (Kuntsche & Kuntsche, 2009).

Responses on the drinking motives and personality measures were recoded as necessary to ensure numeric equivalence across nations. The original versions of both measures used 1 to 5 scales (for motives, 1 = never/almost never, 5 = always/almost always, and for the FFI, 1 = disagree, 5 = agree). Thus, in samples where responses were coded on a different scale, values were re-expressed on a 5-point scale. For example, 4-point (e.g., 0–3 or 1–4) scales were re-coded on a 1–5 scale so as to retain equal spacing between consecutive values (e.g., 1, 2.33, 3.67, and 5 for the 4-point scale). The time frames assessed by the DMQ–R and the NEO-FFI, as well as the original response scales, are listed in Table 2.

Table 1

Sample sizes, year of data collection, principal investigators, location, language, methodology, age, and sex by cultural group

Cultural group Sample	N	Year of collection	Principal investigators	Affiliation	Location of data collection	Language	Method	Mean Age (SD)	Gender (% men)	Citation
Brazil	384	2008–2009	Marco Antônio Pereira Teixeira & Nelson Hauck-Filho	Institute of Psychology, Universidade Federal do Rio Grande do Sul & School of Psychology, Universidade São Francisco	Universidade Federal do Rio Grande do Sul & Universidade de Cruz Alta	Brazilian Portuguese	Paper and pencil	21.51 (3.08)	44.8%	Hauck-Filho, Teixeira, & Cooper, 2012
UK and Ireland	733							20.98 (3.00)	20.1%	
England	89	2010	Patricia Conrod & Peter Musiat	Department of Psychiatry, Université de Montréal & Institute of Psychiatry, King's College London	University of King's College, London	English	Paper and pencil	20.12 (2.29)	14.6%	
Ireland	189	2010	Daniel Regan	Applied Research for Connected Health, University College Dublin	National University of Ireland, Galway	English	Paper and pencil	19.94 (2.08)	14.3%	
Scotland	455		Gillian Bruce	School of Social Sciences, University of the West of Scotland	University of the West of Scotland, Paisley	English	Online	21.59 (3.28)	23.5%	
Canada	1,223							21.17 (2.37)	16.9%	
1	146	2001	Sherry Stewart	Department of Psychology and Neuroscience, Dalhousie University	Dalhousie University, Halifax	English	Paper and pencil	21.07 (2.19)	28.1%	Stewart et al., 2001
2	105	2009–2010	Sherry Stewart	Department of Psychology and Neuroscience, Dalhousie University	Dalhousie University, Halifax	English	Paper and pencil	19.85 (1.96)	19%	
3	74	2010–2011	Roisin O'Connor	Department of Psychology, Concordia University	Concordia University, Montreal	English	Online	19.64 (1.40)	14.9%	
4	898	2012	Roisin O'Connor	Department of Psychology, Concordia University	Concordia University, Montreal	English	Online	21.47 (2.41)	15%	
Hungary	839	2008–2009	Zsolt Demetrovics	Department of Clinical Psychology & Addiction, Institute of Psychology, Eötvös Loránd University	Eötvös Loránd University, Budapest	Hungarian	Online	22.12 (2.10)	37.8%	Németh et al., 2011

Cultural group Sample	N	Year of collection	Principal investigators	Affiliation	Location of data collection	Language	Method	Mean Age (SD)	Gender (% men)	Citation
Mexico	298	2012–2013	Imelda G. Alcalá-Sánchez & Dora Isabel Lozano	Center for Legal Research, Faculty of Law, Universidad Autónoma de Chihuahua & Institute of Social Sciences and Administration, Department of Social Sciences, Universidad Autónoma de Ciudad Juárez	UA Chihuahua, San Felipe & UA Ciudad Juárez, Ciudad Juárez	Spanish	Online	20.26 (1.68)	39.6%	
Netherlands	1,297							19.63 (2.06)	26.4%	
1	471	2009	Reinout Wiers	Department of Developmental Psychology, Faculty of Social and Behavioural Sciences, University of Amsterdam	University of Amsterdam, Amsterdam	Dutch	Online	19.55 (1.87)	28.2%	
2	469	2010	Reinout Wiers	Department of Developmental Psychology, Faculty of Social and Behavioural Sciences, University of Amsterdam	University of Amsterdam, Amsterdam	Dutch	Online	19.57 (1.76)	25.8%	
3	357	2011	Reinout Wiers	Department of Developmental Psychology, Faculty of Social and Behavioural Sciences, University of Amsterdam	University of Amsterdam, Amsterdam	Dutch	Online	19.83 (2.58)	24.9%	
Portugal	489	2009–2010	Joaquim A. Ferreira, Jorge S. Martins, & Mariana S. Coelho	Faculty of Psychology and Education Sciences, University of Coimbra	University of Coimbra, Coimbra	Portuguese	Paper and pencil and Online	20.48 (2.03)	33.7%	
Spain	396	2008–2009	Zsolt Demetrovics	Department of Clinical Psychology & Addiction, Institute of Psychology, Eötvös Loránd University	University of Almeria, Andalusia; University of Sevilla, Sevilla; University of Huelva, Huelva	Spanish	Online	22.28 (2.50)	37.6%	Németh et al., 2011

Cultural group Sample	N	Year of collection	Principal investigators	Affiliation	Location of data collection	Language	Method	Mean Age (SD)	Gender (% men)	Citation
Switzerland	364							22.17 (2.20)	53.6%	
1	170	2010	Emmanuel Kuntsche	Addiction Suisse Research Institute	Lausanne University, Lausanne; University of Geneva, Geneva	French (Kuntsche, Knibbe, Gmel, & Engels, 2006)	Online	22.44 (2.45)	61.8%	Kuntsche & Labhart, 2013
2	194	2009	Emmanuel Kuntsche	Addiction Suisse Research Institute	Lausanne University, Lausanne	French (Kuntsche et al., 2006)	Online	21.94 (1.94)	46.4%	Kuntsche & Kuendig, 2012
US	2,455							18.59 (.96)	41.8%	
1	245	2003	Lindsay Ham	Department of Psychological Science, University of Arkansas	University of Nebraska, Lincoln	English	Paper and pencil	19.78 (1.64)	42.4%	Ham, Bonin, & Hope, 2007
2	1,580	2002	Kenneth Sher	Department of Psychological Sciences, University of Missouri-Columbia	University of Missouri, Columbia	English	Online	18.33 (.49)	38.4%	Sher & Rutledge, 2007
3	512	2003	Stephen Armeli, Howard Tennen	School of Psychology, Fairleigh Dickinson University & Department of Community Medicine and Health Care, University of Connecticut Health Center	University of Connecticut	English	Online	18.79 (1.09)	48.2%	Armeli, Todd, Connor, & Tennen, 2008
4	118	2001	Cynthia Mohr, Stephen Armeli, Howard Tennen	Department of Psychology, Portland State University; School of Psychology, Fairleigh Dickinson University; & Department of Community Medicine and Health Care, University of Connecticut Health Center	University of Connecticut, Storrs	English	Online	18.86 (1.15)	57.6%	Mohr, Brannan, Mohr, Armeli, & Tennen, 2008; Mohr et al., 2005
Total	8,478									

Table 2
Time frame and response scale for Drinking Motives Questionnaire Revised, NEO Five-Factor Inventory, drinking frequency, drinking quantity, and alcohol-use consequences

Sample	Questionnaire	Time frame assessed	Response scale
Brazil	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency[2]	Per week, month	5-point scale, 0–4
	Quantity[2]	Typical	7-point scale, 0–6 (corresponding to 0–10 or more)
	Consequences	Lifetime	Forced choice, yes or no
UK and Ireland			
England	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	N/A	N/A
	Quantity	Typical	Open-ended
	Consequences[1]	Lifetime	5-point scale, 0–4
Ireland	DMQ–R	Lifetime	6-point scale, 1–6
	NEO-FFI	N/A	N/A
	Frequency	Per year	Open-ended
	Quantity	Typical	Open-ended
	Consequences	N/A	N/A
Scotland	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency	Per week	Open-ended
	Quantity	Typical	Open-ended
	Consequences	N/A	N/A
Canada			
1	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per week	Open-ended
	Quantity	Typical	Open-ended
	Consequences[1]	Past 3 years	5-point scale, 0–4
2	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per day, week, month, year	Open-ended
	Quantity	Typical	Open-ended
	Consequences[1]	Past 3 years	5-point scale, 0–4
3	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per day, week, month, year	Open-ended
	Quantity	Typical	Open-ended
	Consequences[1]	Past 3 years	5-point scale, 0–4
4	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per day, week, month, year	Open-ended
	Quantity	Typical	Open-ended
	Consequences[1]	Past 3 years	5-point scale, 0–4
Hungary	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per month	6-point scale, 0–5
	Quantity[2]	Typical	5-point scale, 0–4
	Consequences[1]	Lifetime	5-point scale, 0–4
Mexico	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency	Per week	Open-ended
	Quantity	Typical	Open-ended
	Consequences	Lifetime	5-point scale, 0–4
Netherlands			
1	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency[2]	Per week, month	5-point scale, 0–4
	Quantity[2]	Typical	5-point scale, 0–4
	Consequences[1]	Past year	
2	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency[2]	Per week, month	5-point scale, 0–4
	Quantity[2]	Typical	5-point scale, 0–4
	Consequences	Past year	

Sample	Questionnaire	Time frame assessed	Response scale
3	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency[2]	Per week, month	5-point scale, 0–4
	Quantity[2]	Typical	5-point scale, 0–4
	Consequences[2]	Past year	
Portugal	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	N/A	N/A
	Frequency[2]	Per week, month	5-point scale, 0–4
	Quantity[2]	Typical	5-point scale, 0–4
	Consequences[23]	Past year	5-point scale, 0–4, and dichotomous scale, yes or no
Spain	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per month	6-point scale, 0–5
	Quantity[2]	Typical	5-point scale, 0–4
	Consequences[1]	Lifetime	5-point scale, 0–4
Switzerland			
1	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per day, week, month, year	Open-ended
	Quantity	Typical	7-point scale, 0–6
	Consequences	N/A	
2	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency[2]	Per week, month	5-point scale, 0–4
	Quantity[2]	Typical	5 point scale, 0–4
	Consequences[2]	Past year	5-point scale, 0–4
United States			
1	DMQ–R	Lifetime	5-point scale, 0–4
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per day, week, month	7-point scale, 0–6
	Quantity	Typical	Open-ended
	Consequences[1]	Lifetime	5-point scale, 0–4
2	DMQ–R	Lifetime	4-point scale, 0–3
	NEO-FFI	Lifetime	5-point scale, 1–5
	Frequency	Per day, week, month	7-point scale, 0–6
	Quantity	Typical	11-point scale, 0–10
	Consequences	Pat 3 months	5-point scale, 0–4
3	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	7-point scale, 1–7
	Frequency	Per month	7-point scale, 0–6
	Quantity	Typical	10-point scale, 0–9
	Consequences	Past year	5-point scale, 0–4
4	DMQ–R	Lifetime	5-point scale, 1–5
	NEO-FFI	Lifetime	7-point scale, 1–7
	Frequency	Per month	6-point scale, 0–5
	Quantity	Typical	10-point scale, 0–9
	Consequences	Lifetime	5-point scale, 0–4

Note. DMQ–R = Drinking Motives Questionnaire Revised; NEO-FFI = NEO Five-Factor Inventory; [1] = From the Rutgers Alcohol Problem Index (White & Labouvie, 1989); [2] = From the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001); [3] = From the Brief Young Adult Alcohol Consequences Questionnaire (Kahler, Hustad, Barnett, Strong, & Borsari, 2008).

Similar steps were taken to render self-report measures of quantity, frequency, and consequences of alcohol use commensurate across countries. Frequency responses were standardized for a past-30-day time frame by multiplying frequency per week by 4.33 or dividing frequency per year by 12. Quantity was defined as the typical number of alcoholic drinks consumed on a typical drinking occasion and did not require re-expression across studies. Frequency and quantity measures assessed using ranges instead of actual values were converted to actual values by substituting the mid-point of the range (e.g., "1 to 2 times" and "1 to 2 drinks" were recoded to 1.5). Top categories on such scales (typically labeled as a given value or more, e.g., "9 or more") were converted to the value plus 0.5 (e.g., 9.5).

Finally, responses on the alcohol-related consequences variables were re-coded as either absent (0) or present (1) during one's lifetime. Alcohol-related consequences that were measured in two or more data sets were retained for analyses. These included somatic symptoms (e.g., blackout, hangover), truancy from work or school, problems with schoolwork, social problems, familial problems, violence, defining one's use as problematic, and engaging in unplanned sex as a result of drinking. Time frames and response scales used in the original data collections for frequency, quantity, and alcohol-related consequences are described in Table 2; specific alcohol-related consequences assessed in each study are listed in Table 3.

Table 3

Items included to measure alcohol-use consequences

Sample	1	2	3	4	5	6	7	8	9	10
Brazil	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
UK and Ireland										
England	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
Ireland	No	No	No	No	No	No	No	No	No	No
Scotland	No	No	No	No	No	No	No	No	No	No
Canada	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
Hungary	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
Mexico	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
Netherlands	Yes	Yes	No	No	Yes	No	No	No	No	No
Portugal	Yes	Yes	No	No	Yes	Yes	No	Yes	No	No
Spain	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
Switzerland										
1	No	No	No	No	Yes	No	No	No	No	No
2	Yes	Yes	No	No	Yes	No	No	No	No	No
United States										
1	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
3	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
4	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes

Note. 1 = "Had a blackout"; 2 = "Missed a day of school or work"; 3 = "Problems with schoolwork"; 4 = "Problems with friends"; 5 = "Got into fights"; 6 = "Had a hangover"; 7 = "Felt I had a problem with alcohol"; 8 = "Engaged in unplanned sex"; 9 = "Problems with family"; 10 = "Damaged property." Information for the four Canadian samples and the three Dutch samples were collapsed under "Canada" and "Netherlands," respectively, as problems were consistently reported across samples for these countries.

Discussion

The present study protocol presents the rationale and methodology of DRINC, a cross-national project designed to promote research cross-culturally and cross-nationally on drinking motives. The first goal of DRINC is to evaluate the psychometric properties of the DMQ–R SF in order to validate its use in cultural and language groups outside of North America. Should cross-cultural invariance be established, the project will go on to investigate mean levels of endorsement both within and across cultural groups, as well as similarities and differences in the links between drinking motives and their antecedents and consequences, as previously investigated in the United States, Canada, and Switzerland.

As the first direct, large-scale comparison of drinking motives among university students across cultures, this project will allow researchers around the globe to draw more definitive conclusions about cross-national similarities and differences in the drinking patterns of university students in the same way that past cross-national investigations of other phenomena (e.g., personality and mate preferences) have allowed researchers to draw conclusions about the universality of a specific phenomenon (McCrae & Costa, 1997; Shackelford, Schmitt, & Buss, 2005). Specifically, testing the structural invariance of the DMQ–R SF across countries will allow international scholars to determine its suitability for use as a measure of drinking motives in their country. More broadly, testing a theoretical model of the links between drinking motives and their antecedents and consequences will help identify universal and/or region-specific treatment

targets for university students with alcohol-use problems, allowing clinicians and researchers alike to adapt interventions developed elsewhere (e.g., Conrod et al., 2006; Conrod, Castellanos, & Mackie, 2008; Watt et al., 2008) to local cultural context, if appropriate.

Limitations

It is noted that most of the data from the present project were collected in North America and Western Europe, a reflection of where most of the research on drinking motives has been conducted to date. Because of the availability of international samples suitable for inclusion in these analyses, conclusions drawn from this project may only apply to university students from the countries sampled. However, the development of an international network of alcohol researchers as proposed in this project will stimulate more research in under-represented parts of the world and allow for further global collaboration, with more diverse samples included. Once the network is established, cross-national studies could be designed with sample size and variable requirements specified initially (rather than using archival data), which would strengthen study design and the generalizability of the results.

Further, the present project's data are restricted to university students, as much of the investigations of drinking motives have been conducted in this group and this population is also at high risk for developing alcohol-related problems. Indeed, in developed countries, young adults between the ages of 18 and 24 have the highest level of alcohol consumption across the lifespan (Arnett, 2005). The rates of alcohol use are also high among undergraduates globally (Keller, Frye, Bauerle, & Turner,

2009) and are associated with specific alcohol-related problems for this population, such as poor academic performance (Weschler, Davenport, Dowdall, Moeykens, & Castillo, 1994).

Finally, the authors acknowledge the present study's exclusive focus on personality as the antecedent of drinking motives. To date, most theory development and research has focused on the antecedents of the internally focused motives—coping and enhancement—which has naturally led to a focus on intra-individual factors at the expense of broader social and cultural factors. By also examining cultural factors and how they influence drinking motives, this collaboration will serve to inspire additional research on these neglected facets.

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